

# PATENT ABSTRACTS OF JAPAN

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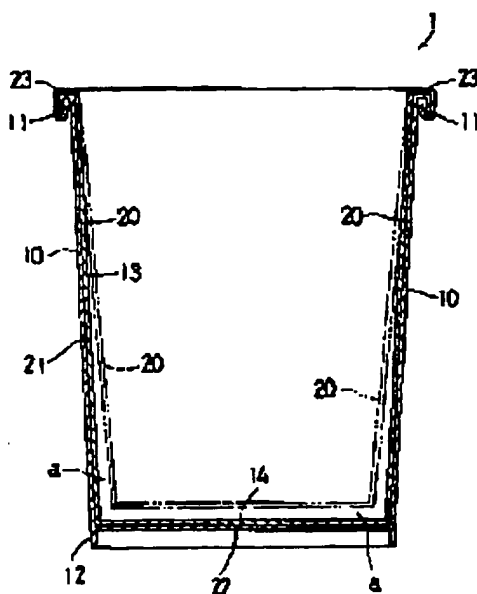
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## (54) CUP CONTAINER AND MANUFACTURE THEREOF

### (57)Abstract:

PURPOSE: To easily burn a cup for food such as miso soup which is eaten with hot water put and realize good stacking ability of the cup container body to save a space during storage, transportation, etc.

CONSTITUTION: An outer cup 10 is formed with an engaging part 11 on an opening edge of the upper rim and with a bottom rim 12 at the lower end. The outer cup 10 is formed by adhering paper with a polyethylene film laminated. An outer face 21 of a body of an inner cup 20 is fitted into an inner face of the body of the outer cup 10, and an outer face 22 of the bottom is fitted into an inner face 14 of the bottom of the outer cup 10, respectively, so that they are approximately tight. A clamp part 23 clamps the engaging part 11 to have the inner cup 20 fixed to the outer cup 10. The inner cup 20 is formed in a double-layered structure with heat shrinkability comprising a layer with polypropylene laminated inside and an outer layer with talc mixed into polypropylene by 50%.



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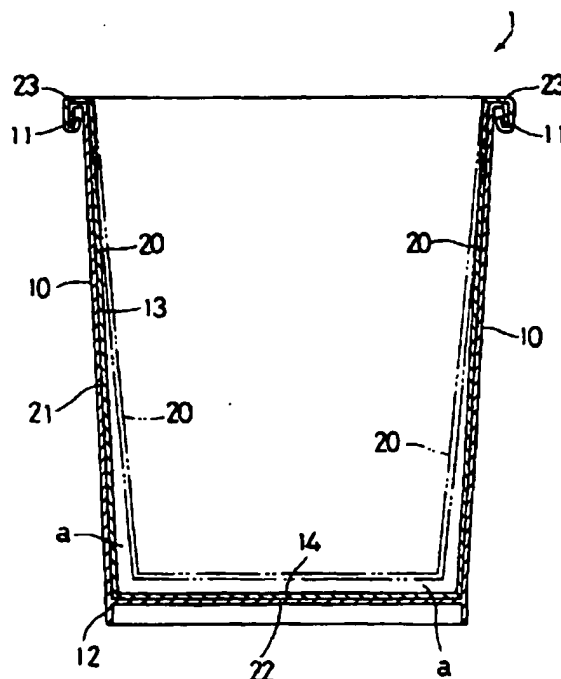
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(54) **[Title of the Invention]** Cup container and manufacture thereof

(57) **[Abstract]**

**[Object]** To [provide] a cup container for foods such as miso soup which are [prepared] for consumption by pouring in hot water, which can easily be incinerated, and wherein the main cup container part has good stacking characteristics, which saves space during storage, transport and the like.

**[Constitution]** An engagement part 11 is formed on the rim of the upper opening of an outer cup 10 and a bottom rim 12 is formed at the bottom of the outer cup 10. The outer cup 10 is formed by adhesively affixing paper that is laminated with polyethylene film. An inner cup 20 is fitted into this so that the outer face 21 of the body is in substantially close contact with the inner face 13 of the same part of the outer cup 10, and the external bottom face 22 thereof is in substantially close contact with the inner face 14 at the bottom of the outer cup 10. A rolled closure part 23 is rolled closed on the engagement part 10 so as to fasten the inner cup 20 to the outer cup 10. The inner cup 20 is formed so as to be thermally contractive, by way of a two layer structure comprising a polypropylene laminated layer at the inside and an outer layer wherein 50% talc has been admixed to polypropylene.



**[CLAIMS]**

**[Claim 1]** A cup container characterized by comprising: an outer cup formed principally of paper; and an inner cup, which is formed so as to be thermally contractive, and which is provided in substantially close contact with the interior of this outer cup<sup>1</sup>

**[Claim 2]** The cup container recited in claim 1, wherein the outer cup and the inner cup are joined by a rolled closure through which air can flow.

**[Claim 3]** A method for manufacturing a cup container characterized in that an inner cup, which is formed so as to be thermally contractive, and which has a planar flange at the top, is received in substantially close contact within an outer cup, which is formed principally of paper, and which has an engagement part at the upper rim; the flange of the inner cup is heated so that the flange rolls closed on the engagement part of the outer cup, whereby the outer cup and the inner cup are joined.

**[Detailed Description of the Invention]**

**[0001]**

**[Field of Industrial Application]** The present invention relates to a heat insulating cup container for food such as instant "cup ramen" and curry, which are [prepared] for consumption by pouring in hot water or heating in a microwave.

**[0002]**

**[Prior Art]** In the past, heat insulating cup containers of this sort have been developed for use in products that are [prepared] for consumption by pouring in hot water, such as udon noodles in a bowl, instant "cup ramen" and instant miso soup, for which cups made out of resins, such as foamed polystyrene, were the most popular.

**[0003]** Furthermore, there exist containers having double structures; for example, there are those that comprise, as shown in FIG. 4, an outer cup 31 made of paper, and an inner cup 33, which is provided at the interior of this outer cup 31 with a gap 32 therebetween.

**[0004]**

**[Problems to Be Solved by the Invention]** The usage [temperatures] for cup containers made from foamed polystyrene and the like, such as described above, are usually limited to no higher than the boiling point of water at atmospheric pressure, and thus they generally could not withstand use in a microwave. Furthermore, as these were formed from resins alone, the amount of heat generated by combustion when these were incinerated was approximately 10,000 to approximately 11,000 kcal/kg; and when polystyrene resin was used, black ashes were produced when these were incinerated, and complete combustion was difficult. Furthermore, because these were formed from foamed resins, it was necessary for them to be formed with a certain amount of thickness, in order to give them strength; as a result of which the stacking characteristics were inferior, and thus the number that could be transported and stored per unit of volume was small, and the surface area that was in contact with the external atmosphere was a large, which increased the likelihood of soiling.

**[0005]** Furthermore, the double structure cup containers described above required that a gap [be provided] as a heat insulating layer, and therefore the main cup container part was thick and, as shown in FIG. 5, the stacking characteristics were poor. Accordingly, the same problems were present as for the foamed resin cup containers described above.

**[0006]** The present invention solves the problems described above, an object thereof being to provide a main cup container

part, which is heat insulating, which can easily be incinerated, and wherein the main cup container part has good stacking characteristics so that it is possible to save space in storage and transportation, and so that soiling does not readily occur.

**[0007]**

**[Means for Solving the Problems]** The present invention is directed at achieving the objects described above, and therefore the present invention has a constitution characterized by comprising an outer cup, which is formed principally of paper, and an inner cup, which is formed so as to be thermally contractive, and is provided within this outer cup, in a substantially close-fitting state.

**[0008]** The inner cup is thermally contractive and therefore, when filled with hot water or heated in a microwave or the like, it contracts. In order to form the inner cup so as to be thermally contractive, the cup is formed by way of a low-temperature solid-phase pressure forming method at lower than the melting point of the resin, so as to apply intermolecular orientation to the resin (biaxial stretching). In other words, because hot fixing of the intermolecular stress is not performed during formation, [the resulting product] produces a specific amount of thermal contraction when heated. Furthermore, at normal temperatures, molecularly oriented formed articles have good rigidity and gas barrier characteristics, and the impact strength and tensile strength thereof is made 1.5 to 3 times greater.

**[0009]** The degree of contraction of the inner cup will be adjusted as suitable according to the shape of the container, the content and the like, but this is preferably such that it is possible to produce a gap between [the inner cup] and the outer cup of approximately 0.5 to 5 mm.

**[0010]** Polypropylene, polyester, polyethylene, and other polymers having good gas barrier characteristics can be used as the material for the inner cup, which may have a single layer structure or a multilayer structure. Furthermore, in order to improve combustion characteristics, various inorganic substances such as calcium carbonate and talc can be admixed. Among these [possible structures], a multilayered constitution based primarily on polypropylene or a multilayered constitution including layers to which inorganic substances have been admixed is preferred; for example, a polypropylene/EVAL/polypropylene layered structure to which an inorganic substance has been admixed is preferred.

**[0011]** The outer cup is formed primarily out of paper, and may be laminated with polypropylene film, polyethylene or the like, as necessary. For example, [a container] wherein 15 to 30  $\mu\text{m}$  [thick] thermal adhesive resin, such as polyethylene or polypropylene, is laminated on 150 to 50  $\text{g/m}^2$  paper can be formed using ordinary paper cup manufacturing equipment. Such a cup is highly rigid, is excellent in terms of supporting the weight of the contents without softening, even if the temperature is raised, has no thermal deformation, has excellent heat insulation (the thermal conductivity is low) and does not cause environmental problems as a result of incineration after use. Furthermore, decorative printing may be carried out directly on the surface of the outer cup.

**[0012]** The outer cup and the inner cup are preferably joined by a rolled closure, through which air can flow. In other words, this rolled closure is not a rolled closure for a perfect gas-tight seal, rather this is formed so that air can flow between the gap that is formed between the inner cup and the outer cup and the exterior of the cup container. In other words, immediately after pouring in hot water, a gap is formed as the result of the contraction of the inner cup, and therefore air flows into the gap from the exterior

<sup>1</sup> No punctuation is used at the end of the original Japanese claims. - trans.

by way of this rolled closure, whereafter the air that has flowed into the gap is heated by the inner cup, so that the air in the gap undergoes thermal expansion and exits to the exterior of the cup by way of the rolled closure.

[0013] In order to join the outer cup and the inner cup by a rolled closure through which air can flow, an inner cup having a planar flange at the top, which is formed so as to be thermally contractive, is received in a substantially close-fitting manner within an outer cup having an engagement part at the upper rim thereof, which is formed primarily from paper, and by heating the flange of the inner cup, the flange rolls closed on the engagement part of the outer cup.

[0014] The main cup container part of the present invention can suitably be used as a cup container for products such as those wherein heat is applied to the container when [preparing] it for consumption, by pouring in hot water, heating in a microwave or the like, and can, for example, be applied to containers for instant "cup noodles," instant soups, instant coffee, instant miso soup, curry, stew, rice porridge, and oshiruko<sup>2</sup>. Furthermore, it can be applied in various other applications that require thermal insulation to keep things hot or to keep things cold.

[0015]

[Operation] With the cup container of the present invention, before hot water or the like is poured into the inner cup, the inner cup and the outer cup are in a substantially close-fitting state thus present little thickness, and as a result of pouring hot water or the like into the inner cup, the inner cup contracts, forming an air layer between the inner cup and the outer cup, and this air layer works as a heat insulating layer. In other words, when the hot water is poured in and the inner cup contracts by the prescribed amount, the space [between] the inner cup and the outer cup increases towards the bottom, but at the topmost portion, no contraction whatsoever occurs, because this is fixed in place. Accordingly, an air layer is caused to be present between the inner cup and the outer cup.

[0016] In the process in which hot water is poured into the inner cup and heat is transmitted to the outer cup so that heat reaches to the outer wall of the outer cup, the following conditions for blocking heat transmission, which is to say the following heat insulation effect, occurs.

[0017] - Heat transmission is blocked by the boundary film between the hot water (contents) and the inner wall of the inner cup.

- The material of the inner cup itself has a low thermal conductivity coefficient.

- Heat transmission is blocked by the boundary film between the outer wall of the inner cup and the air layer that contacts it.

- Heat transmission is blocked by way of air layer radiation.

- Heat transmission is blocked by the boundary film between the inner wall of the outer cup and the air layer.

- The outer cup, which is primarily made of roll<sup>3</sup>, has a low thermal conductivity coefficient.

- Heat transmission is blocked by the boundary film at the outer surface of the outer cup.

[0018] Accordingly, a temperature differential of 30 to 55°C arises [between] the temperature in the inner cup, into which the hot water has been poured, and the outer wall of the outer cup that is held by a person when [the contents] are consumed.

[0019] Furthermore, when the cup container is manufactured, the flange can be rolled closed on the engagement part of the outer cup simply by heating the flange of the inner cup,

allowing the inner cup and the outer cup to be fixed in a very simple manner; and because the rolled closure is not adhesively bonded, air can flow freely through the part that is rolled closed, so that air flows smoothly between the outside and the gap that is formed as a result of contraction of the inner cup.

[0020]

[Embodiments] One embodiment of the cup container of the present invention is described with reference to the figures. FIG. 1 is a sectional view of a cup container; FIG. 2 is a front view of stacked cup containers; and FIG. 3 is a sectional view showing the process of manufacturing a cup container.

[0021] With reference to the cup container 1 shown in FIG. 1, reference symbol 10 [indicates] an outer cup and reference symbol 20 [indicates] an inner cup that is received within the outer cup 10 and fixed in place. The outer cup 10 is tapered so as to form a cylinder having a slightly reduced diameter at the bottom; an engagement part 11 is formed at the rim of the upper opening end, which opens outward and then bends at approximately 90°, and a bottom rim 12 is formed at the bottom. Such an outer cup 10 is formed by adhesively affixing paper that is laminated with polyethylene film.

[0022] The inner cup 20 is also formed as a cylinder having a slightly reduced diameter at the bottom, and the angle of inclination is the same as that of the outer cup 10. Next, the inner cup 20 is fitted into [the outer cup 10] so that the outer face 21 of the body is in substantially close contact with the inner face 13 of the same part of the outer cup 10, and the outer bottom face 22 is in substantially close contact with the inner face 14 at the bottom of the outer cup 10. Furthermore, a rolled closure part 23 is formed at the rim of the upper opening of the inner cup 20, and this rolled closure part 23 is rolled closed on the engagement part 11, so as to fasten the inner cup 20 to the outer cup 10.

[0023] This inner cup 20 is formed as a two layer structure, comprising a polypropylene laminated layer at the inside and an outer layer wherein 50% talc has been admixed to polypropylene.

[0024] In order to manufacture a cup container 1 such as described above, first, the outer cup 10 is manufactured from paper and the inner cup 20 is formed by low temperature solid phase pressure forming, and at this time a planar flange 24 is formed at the top edge of the inner cup 20, which will become the rolled closure part 23 as a result of subsequent thermal contraction. As shown in FIG. 3, the separately formed outer cup 10 and inner cup 20 are united, with the inner cup 20 inserted into the outer cup 10, so that the faces thereof are in close contact. Then, when the flange 24 is heated with hot blown air at 250 to 500°C, because strong intermolecular orientation is also applied to the opening region by way of the low temperature solid phase pressure forming method, the flange 24 immediately softens and rolls closed around the engagement part 11 to form the rolled closure part 23.

[0025] A cup container 1 of this sort is such that the inner cup 20 is filled with a processed and seasoned food product such as ramen, the opening is closed with an easy-peel cover or an over-cap (not shown in the drawing) and the entire [product] is packaged in a sealed manner with plastic film. Next, when the ramen is to be consumed, hot water is poured into the inner cup 20; at this time, as air can flow between the rolled closure part 23 and the engagement part 11, the inner cup 20 into which the hot water has been poured contracts as a result of this heat, and an air layer a is formed between this and the inner face 14 of the body of the outer cup 10, as indicated by the dotted and dashed line in the figure. Accordingly, because the air layer a is present between the inner cup 20 and the

<sup>2</sup> A sweetened red bean drink which is consumed hot. -- trans

<sup>3</sup> It seems there is a typographical error in the original Japanese. This should probably have been "paper."

outer cup 10, this air layer a exhibits a heat insulation effect so that heat is prevented from reaching the outer face of the outer cup 10.

[0026] Furthermore, a main cup container part 1 such as described above is not thick and therefore, as shown in FIG. 2, large portions of the cup containers 1 overlay each other, allowing for extremely efficient stacking.

[0027]

[Effects of the Invention] Because the present invention has the constitution described above, it has the effects described below.

- The stacking characteristics of empty containers is extremely good. Accordingly, the cost of transporting and storing the empty containers is greatly reduced.

- The incineration characteristics are good because it is combined with paper. In other words, the heat produced by combustion is no greater than approximately 6,000 kcal/kg and no harmful residues or harmful gases whatsoever are produced.

- Even if filled with oil-based food products or brought to temperatures in the vicinity of 100°C, resin breakdown products are not transferred to the food product, which improves food safety.

- Even if hot water at 90°C or higher is poured in, the air gap provides thermal insulation and therefore the surface of the

outer cup will be at approximately 60°C, so that it is possible to hold [the container] in one's hands for long periods of time while feeling the warmth from within the inner cup. Furthermore, as the fact that there is something hot within the inner cup can be determined, it is possible to prevent burns to the mouth, tongue and the like when eating or drinking.

- This can be heated in a microwave.

#### [Brief Description of the Drawings]

[FIG. 1] is a sectional view of one embodiment of a main cup container part of the present invention.

[FIG. 2] is a front view showing a situation wherein one embodiment of main cup container part of the present invention is stacked.

[FIG. 3] is a sectional view showing the process for manufacturing a cup container of the present invention.

[FIG. 4] is a sectional view of a conventional main cup container part.

[FIG. 5] is a front view showing a situation wherein a conventional main cup container part is stacked.

#### [Explanation of the Reference Numerals]

1	cup container
10	outer cup
20	inner cup
a	air layer

FIG. 1

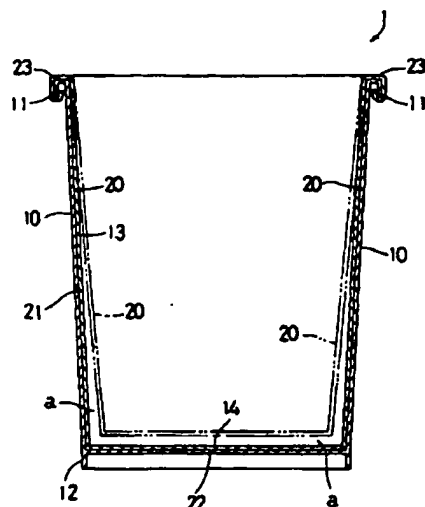


FIG. 2

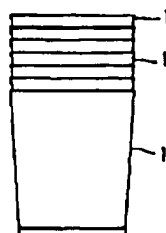


FIG. 3

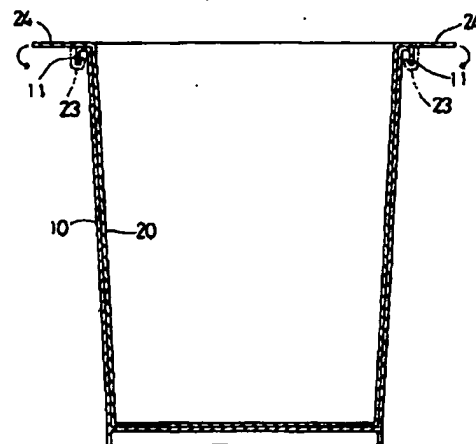


FIG. 5

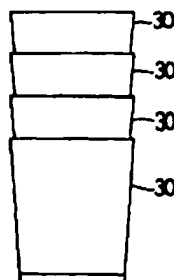


FIG. 4

